Risk factors of post-stroke depression among stroke survivors in Lagos, Nigeria

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Abstract
Objective: Stroke is an important neurological problem and a leading cause of death in clinical practice. Among survivors, over half have significant disabilities; and/ or psychiatric complications most especially Post-stroke depression (PSD). The study aimed to establish prevalence and risk factors for post stroke depression. **Method:** A prospective study carried out among selected stroke survivors in Lagos University Teaching Hospital (LUTH). Subjects included those who satisfied the WHO definition of stroke. The necessary socio-demographic data was obtained from each subject; the Depression Anxiety Stress Scale-21 (DASS-21) and Modified Motor Assessment Scale (MMAS) were administered. Risk factors of PSD studied were gender, laterality of stroke, post stroke functional impairment and post stroke duration before clinical presentation. **Results:** A total of 51 stroke survivors were studied, made up of 31 (60.8%) males and 20 (39.2%) females. The mean age was 52.5±5.9 years; and age range of 40-64 years. From assessment with the depression subscale of DASS-21, 38 (74.5%) of the subjects were normal and the rest 13 (25.5%) had depression. Risk factors found to be statistically significant for PSD in the study included: gender (X^2=10.3 at p=0.001*) and stroke laterality (X^2=6.1 at p=0.013*). However, there were no statistically significant differences for mean post-stroke duration before clinical presentation and PSD ("t"=3.5 and p= 0.073); and post-stroke disability as shown by mean MMAS scores and PSD ("t"=7.6 and p= 0.084). **Conclusion:** Depression was found to be an important complication among stroke survivors in our study. Important risk factors found for PSD included gender and laterality. The findings emphasized a need for appropriate health facilities and for stroke survivors to present early for treatment to attenuate stroke complications.

Key words: Risk factors; Stroke; Depressive disorder

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Introduction

Stroke is a common neurological problem and the third leading cause of death in developed countries of the world.[1,2] Among survivors, over 50% have significant disabilities; and in clinical practice, neuro-psychiatric disturbances are also frequent.[3,4,5] One of the commonest psychiatric complication of stroke is depression[6,7] and the National Institute of Mental Health (NIMH) estimated that 10-27% of stroke survivors will experience major depression while additional 15-40% will have symptoms of depression within two months following a stroke.[8]

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There are ongoing debates regarding similarities and differences in depression among people both with and without organic brain damage.[9] Especially among post-stroke depressed subjects, where there is a debate as to whether depression is due to organic changes related to the stroke or due to the psycho-social adjustment required as a result of the disease. There is an observed overlap between the somatic symptoms of depression and symptoms of physical illness.[9] However, findings from various studies have shown somatic symptoms to be the best indicator of depression, even in patients with medical disease, with proven validity of the standard rating scales not only to detect depression but rate its severity.[10,11] Therefore, in summary, depression in physical illnesses, such as stroke is not qualitatively different to the sort of depression found in psychiatric patients[9,11] and the combination of organic pathology from stroke as well as the post-stroke psycho-social adjustment problems could be contributory to the onset of Post-stroke depression (PSD).[6,7,9]

Stroke recovery can be negatively affected by depression because of the loss of motivation to recover and less compliance with rehabilitation programmes amongst sufferers.[8] Thus, prompt treatment of PSD is essential to enhance quality of life, reduce pain and disability, enhance more rapid recovery from stroke and shorten hospital length of stay.[12] Consequently, PSD is usually treated with antidepressant medication[4,8,12,13,14] and most times combined with psychological therapy. Cognitive-behaviour therapy (CBT) is an effective psychological treatment of choice not only for depression in the general population but also for PSD.[15,16] CBT is particularly useful in PSD as this facilitates reinterpretation of the depressogenic beliefs and inaccurate assumptions stroke patients frequently develop about their illness and their life after stroke.[9,17] Furthermore, psychological therapies have been found to be useful prophylactic intervention against the development of depression after stroke especially among subjects with a number of both psychosocial and physical risk factors for the PSD.[7,18,19] Some of these risk factors of PSD include post-stroke disablement[20], female gender[21], laterality of stroke[22], duration after stroke[23] amongst others. In Nigeria, the paucity of data on post-stroke depression (PSD) and its associated risk factors prompted this study.

Method

Subjects and Setting

The study was conducted at the Lagos University Teaching Hospital (LUTH), Idi-Araba, Lagos. Subjects included in the study were those who satisfied the WHO definition of stroke, that is: "focal or global neurological impairment of sudden onset, and lasting more than 24 hours and of presumed vascular origin".[24] Furthermore, patients included in the study were those with some forms of motor disability and intact cognition (as assessed with Mini Mental State Examination). Aphasic patients were excluded from the study. The laterality (focus) of stroke was determined mostly from clinical evaluation; and due to logistic problems and high cost only a few cases from neuro-imaging studies.

As part of the approved ethical clearance for the study, informed consent was also obtained from each patient.

Instruments

Sociodermographic data was obtained using appropriate questionnaire. The subjects were studied using the following instruments:

Depression Anxiety Stress Scale (DASS-21)

This is a short form of Lovibond and Lovibond's (1995) 42-item self-report measure of depression, anxiety and stress.[25] With preserved psychometric properties of the original instrument, the DASS – 21 was designed to measure the three affective states of depression, anxiety and stress. The depression sub-scale assesses dysphoria, hopelessness, devaluation of life, self-depreciation, amotivation and anhedonia. The anxiety subscale assesses autonomic arousal, situational anxiety and subjective experience of anxiety. The stress subscale assesses difficulty relaxing, nervousness, agitation and irritability.[26] The DASS-21 has 21 domains with each one scored between 0-3. Seven of the items viz: 3,5,10,13,16,17 and 21 constitute the depression subscale. According to Lovibond and Lovibond[25], the obtained score is standardized by multiplying it by a factor of 2. Thus, the standardized score possible with the depression subscale varies from 0-42. A normal DASS-21 score for depression subscale is 0-9, mild depression is 10-12, moderate is 13-20, severe is 21-27 and extreme or very severe depression is 28-42.[25] The validity and reliability of DASS-21 have been well established.[25,26,27,28]

Modified Motor Assessment Scale (MMAS):

MMAS is an instrument used to assess functional, that is motor impairment in stroke patients.[29] It is an eight-task item instrument. The possible scores for each item task is 0-6; with a maximum of 48 points in overall assessment.

Procedure

Each subject was administered the DASS-21 to complete. For the few that could not write due to the motor effect of their stroke but with intact cognition and ability to comprehend the item questions, the questionnaire was completed by the first researcher (JOO) in line with such subject's choice for each item. Each of the subjects was also assessed with the MMAS to determine his/ her levels of motor functioning/ impairment.

Data Analysis

The data was entered into SPSS version 10 on PC. Descriptive statistics of frequency tables mean and standard deviation was carried out on the variables. Inferential statistics of chi-squared and Mann-Whituey U were used to test for significance differences in the subjects' scores. Level of significance was set at $p<0.05$.

Results

Fifty one stroke survivors in all were studied made up of 31(60.8%) males and 20(39.2%) females. The mean age of the subject was 52.5±5.9 years; and age range of 40-64 years.

Stroke morbidity

Thirty one (60.8%) subjects had right sided hemispheric location of the stroke ; and the remaining 20 (39.2%) had left sided lateralization. The mean duration between the time of stroke and presentation to the hospital was 11.3 ± 5.6 months.

DASS-21 Scores/ Post Stroke Depression (PSD):

From the scores obtained on DASS – 21 by the subject; 38(74.5%) were normal while the remainder, 13(25.5%,) were depressed. According to DASS-21 classification, five (9.8%) were moderately depressed, 7(13.7%) severely depressed and 1 (2.0%) extremely depressed *(Table I)*. Overall, the mean DASS-21 score for the subjects was 11.2 ± 7.8.

Table I: Cases of Depression from DASS-21 Assessment (N=58)

	Number	*%*
No depression (DASS score 0-9)	38	74.5
Mild depression (DASS score 10-12)	0	0
Moderate depression (DASS score 13-20)	5	9.8
Severe depression (DASS score 21-27)	7	13.7
Extreme severe depression (DASS score 28-42)	1	2.0
Total	*51*	*100.0*

Risk Factors of PSD (Table II)

Gender: In term of gender distribution among the PSD subjects, 5(38.5%) were males, (that is 16.1% of male subjects) and 8(61.5%) were females (that is 40% of the female subjects); giving male: female ratio of 1:2.5 for those with post stroke depression. The gender difference for PSD among the subjects was statistically significant with X^2=10.3 at p=0.001*.

Stroke Laterality: On distribution of PSD according to laterality of the stroke focus; 10(76.9%) of the 13 subjects with PSD had their stroke focus in the right hemisphere and the rest 3 (23.1%) had theirs in the left hemisphere. This gave a ratio of 1:3.3 for left: right hemispheric location of stroke subjects with PSD. The difference in hemispheric localization of stroke focus is statistically significant with X^2=6.1 at p=0.013*.

Post Stroke Functional Impairment: For post stroke motor functional level as assessed with MMAS; 20(39.2%, N=51) of the subjects had poor motor functioning (that is MMAS score less than 25). Of this category, 8(15.7%) had PSD on DASS-21 assessment. Hence, 40% (8 out of 20) of those with "poor" motor functioning had PSD; and thus subjects with "poor" motor functioning constituted 61.5% (8 out of 13) subjects with PSD. For the rest 31(60.8%, N=51) with "good" motor functioning (MMAS score ≥25), only 5, that is 16.1% of the 31 subjects with "good" MMAS scores had PSD; showing that subjects with "good" motor functioning constituted 38.5% (5 out of 13) subjects with PSD. Thus, the ratio of subjects with "good MMAS score" to "poor MMAS score" that had the complication of PSD is 1:2.5. The mean MMAS score for the non-depressed subjects was 16.3 ± 6.1 and for those with PSD ones was 12.5 ±6.8, and the difference was not statistically significant ("t"=7.6, p=0.084).

Table II: Risk Factors of Post Stroke Depression (PSD) (N=58)

Sex (Gender)	*No. of PSD*	*% of PSD (n=13)*	*% of Sex*
Males	5	38.5	16.1(n=31)
Females	8	61.5	40.1(n=20)
Total 13 100.0			
Male: Female ratio for PSD = 1:2.5 X2=10.3, p=0.001*			
Laterality of Stroke	*No. of PSD*	*% of PSD*	
Right hemisphere	10	76.9	
Left hemisphere	3	23.1	
Total	*13*	*100.0*	
Left: Right Hemispheric Ratio for PSD = 1:3.3 X2=6.1, p=0.013*			
Post Stroke Impairment	*No. of PSD*	*% of PSD*	*% of MMAS Scores*
MMAS≥ 25	5	38.5	16.1(n=31)
MMAS < 25	8	61.5	40.0 (n=20)
Total 13 100.0			
"Better" Motor Functioning: "poor" Motor Impairment for PSD=1:2.5 (MMAS ≥ 25) (MMAS <25) Mean MMAS scores: Non-depressed Subjects: 16.3± 6.1; Depressed Subjects: 12.5 ±6.8 U=32.5, p=0.23 "t"=7.58, p=0.84.			
Post Stroke Period/onset of f PSD	*No. of PSD*	*% of PSD.*	
≤ 6 months	9	69.2	
7-12 months	2	15.4	
>12 months	2	15.4	
Total	13	100.0	
Ratios of period of onset of PSD following stroke is: ≤ 6 months: 7-12 months: >12 months = 4.5:1:1 Mean DASS-21 Scores and Post Stroke Duration:			
Duration	≤6 months	7-12 months	>12months
Mean score	18.9±9.8	9.0 ±4.5	8.2 ±5.2 "t"=3.5, P=0.073*

Post-stroke Duration and Depression: Nine (69.2%) of the 13 subjects with the complication of PSD were among those that presented within the first 6 months following stroke; and 2 (15.4%) subjects each among those that presented in the periods 7-12 months and > 12 months following stroke respectively. This gives a proportional ratio of subjects with PSD as 4.5:1:1 for ≤6 months:7-12 months and >12 months periods of presentation respectively. The mean DASS-21 score according to post stroke duration are as follows: 18.9 ±9.8 (≤ 6 months), 9.0 ± 4.5 (7-12 months) and 8.2± 5.2 (>12 months). The difference was not statistically significant with "t"=3.5 and p=0.073.

Discussion

Stroke remains a major cause of death and disability in Nigeria[30]; but little or no attention has been focused on the possible psychiatric morbidity that could complicate the problem among survivors. In our study, an attempt was made to evaluate for depression with particular focus on risk factors among stroke survivors.

From various studies in Europe and America, a number of risk factors have been identified for PSD among stroke survivors. In a systematic review by Oumet et al (2001), past history of depression or psychiatric illness, social isolation and functional impairment were consistently identified as risk factors for PSD.[31] In more recent reviews by Hackett et al (2005) and Carota et al (2005), physical disability (functional impairment) and stroke severity were identifiable important risk factors for PSD.[14,32] However, in addition to the aforementioned factors, Paolucci et al (2005) in a multicentre observational study of PSD also identified female sex and previous stroke as factors likely to facilitate the development of PSD.[33]

In our study, gender was found to be an important risk factor of PSD that is, the female subjects were 2.5 times more likely to develop PSD than their male counterparts and the difference was statistically significant(X^2= 10.3 and P=0.001*). The presence of gender differences is in agreement with some previous studies where females showed a higher probability of developing PSD than males.[7,19,31,34] Even in the general population, depression is known to be more common amongst females.[18,26,31]

The relationship between stroke laterality and PSD is a controversial one. In a systematic review by Carson et al (2000), 38 studies found no significant difference between stroke laterality (site of lesion) and PSD, two reported increased risk with left sided lesions and seven reported increased risk with right sided lesions.[22] Rao (2001) also found that the side of the lesion per-se was not associated with specific neuro-psychiatric disorders including PSD.35 However, in our study, subjects with PSD were more likely to have their stroke lesion over the right hemisphere and the difference in laterality was statistically significant (X^2=6.1, P=0.013*). Again, when compared with previous studies especially the systematic review by Singh et al (1998)[36], he found varying relation ships between stroke laterality and PSD just as Carson et al (2000).[22]

Stroke survivors often suffer some degree of long term impairment such as partial or complete loss of locomotion with about 80% of patients with acute stroke presenting with weakness or paralysis of either the upper or lower extremity or both. Other possible areas of impairments include activities of daily living (ADL), cognition and communication skills.[37,38] Even in Nigeria with close knit family system and social support, stroke survivors still suffer functional impairment significant enough to be an important risk factor of PSD.[39] In our study, motor impairment was found to be an important risk factor of PSD. The study showed 16.1% of subjects (31) with "good" MMAS score (motor performance) had PSD as compared with 40.0% of subjects (20) with "poor" MMAS score. However, the difference between the mean MMAS scores for the two groups was not statistically significant ("t"=7.6, p=0.084). Compared with previous studies, Van de Weg et al (1999) in Netherlands[40], Gillen et al (2001) in USA41 and Nannetti et al (2005) in Italy[38] also found non-statistically significant relationship between functional disability and PSD. However, Loong et al (1995) found strong relationship between functional impairment and PSD.[42] In Nigeria where there is no social insurance, the prolonged hospitalization required in stroke survivors with subsequent inability of many to return to work due to functional motor impairment is a great economic burden on the family. This further contributes to functional impairement, a potential great risk factor of PSD in Nigeria.[30,43,44]

From our study, subjects with ≤6months stroke were more likely to suffer from PSD, and the difference between ≤ 6 months and > 6 months duration was statistically significant (X^2=10.8 at p= 0.005*).Our finding is in agreement with those from previous studies where the highest incidence of PSD was in the first few months following stroke.[19,44,45] Perhaps, the reality of sudden functional impairment around the time of stroke and possible appreciable recovery over time might partly explain the high incidence of PSD within the first few months following stroke.

Conclusion

The current study has identified some important risk factors of PSD among stroke survivors in Nigeria. It is recommended that public health education on the need for early presentation of stroke survivors to health facilities should be rigorously pursued. Further, the health facilities in Nigeria, and potentially other African countries too, should be upgraded to enhance treatment for stroke survivors; and health practitioners should always be aware of the possibility of PSD among stroke survivors most especially those with identifiable risk factors so as to institute prompt treatment intervention.

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